

II. The Impact of Asthma

Those concerned about health in Washington State have a large number of important conditions and risk factors to prioritize. Resources for public health are limited and not every public health issue can be addressed. Asthma ranks among those creating the greatest public health burden, and thus should be considered by decision-makers as deserving attention.

The impact of asthma is explained in this chapter in terms of costs. The costs of asthma to the public are quantified in terms of loss of life, hospitalizations, medical care utilization, and dollars. The burden of asthma for individuals and families is described in terms of symptoms that interrupt normal activities and associated decreases in quality of life.

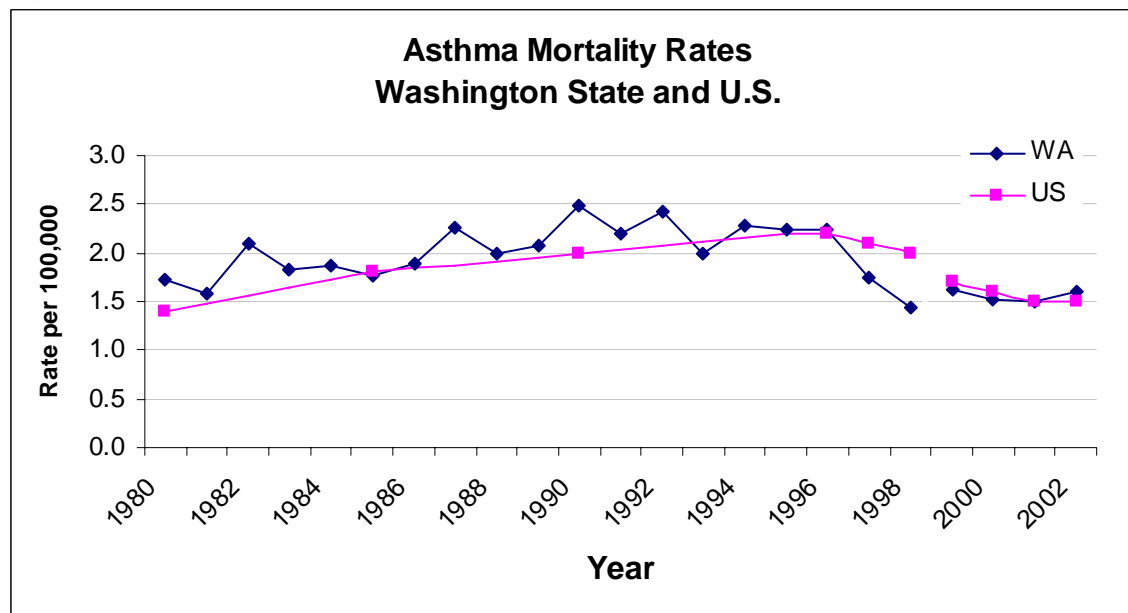
A. Deaths

There were 93 deaths attributed to asthma in Washington in 2002. Washington asthma death rates have been roughly comparable to national rates. Death rates from asthma increased steadily from 1980 until the mid-1990s (see Figure 1). Washington's death rate then declined by about forty percent from 2.5 per 100,000 in 1990 to 1.6 per 100,000 in 2002.¹

Adults with asthma have also been shown to have greater risk of death due to heart disease and chronic obstructive pulmonary disease (COPD),ⁱ thus the number of deaths reported here are an underestimate of the true number of deaths in which asthma was a significant contributing factor.

¹ p<.001 for decreasing trend in Washington State between 1990-2002

Figure 1: Trends for asthma deaths, WA and US



Source: 1980-2002 National Death Certificates, Washington State Death Certificates. Asthma as primary cause of death. Rates per 100,000, age-adjusted to 2000 US population. Data format changed between 1998 and 1999, indicated on chart by discontinuous line.

Deaths due to asthma among adults have been related to history of clinically severe disease and patients not having appropriate medications. In particular, failure to prescribe inhaled steroids after hospitalization for asthma has been linked to increased risk of asthma death. Improvement in medical practices for treating asthma was perhaps spurred by the publication of clinical guidelines in 1991 by the National Institutes of Health (NIH) National Asthma Education Prevention Program (NAEPP)ⁱⁱ and may explain the national and state decreases in asthma mortality.

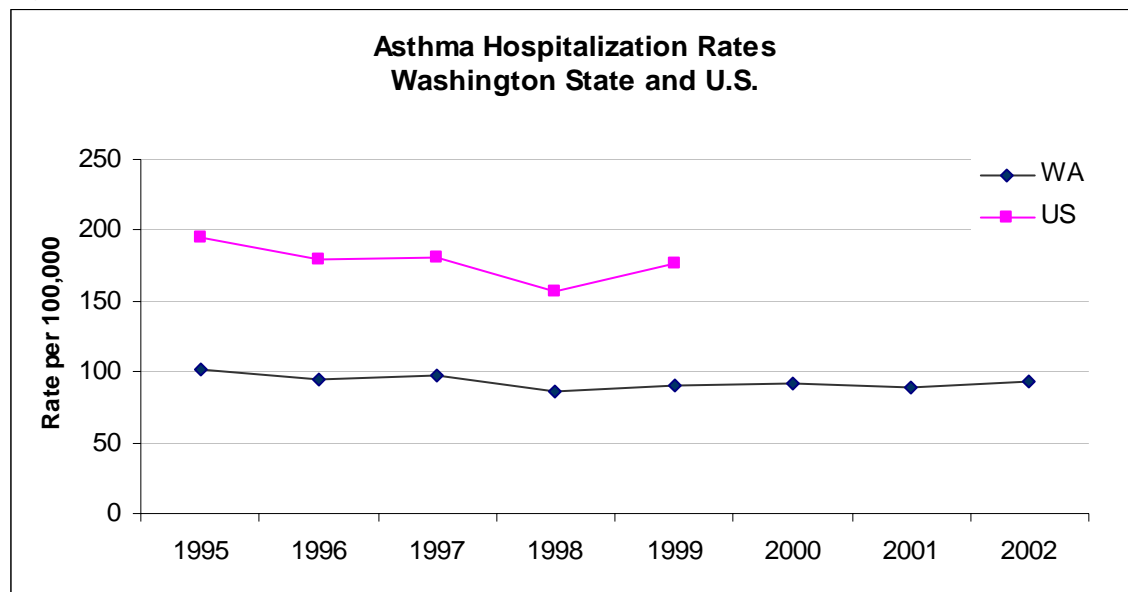
Among children, asthma deaths have been associated with seizures, but more strongly with factors such as poor communication between the child and parents about symptoms, conflict between parents and medical providers (including failure to follow medical directions), and child depression.ⁱⁱⁱ

B. Hospitalization

In 2002 there were 5,540 hospitalizations for asthma in Washington State, a rate of 93 per 100,000 population. This was nearly half the last known national hospitalization rate of 176 per 100,000 (1999).

Figure 2 shows that Washington State hospitalization trends for asthma have been quite stable since 1995. While the nation has seen a small decline and Washington has not, hospitalization rates have been consistently much lower than national rates.

Figure 2: Trends for asthma hospitalizations, WA and US



Source: National Hospital Discharge Survey, Washington State Comprehensive Hospital Abstract Reporting System (CHARS). Asthma as principal diagnosis, age-adjusted to 2000 US Population.

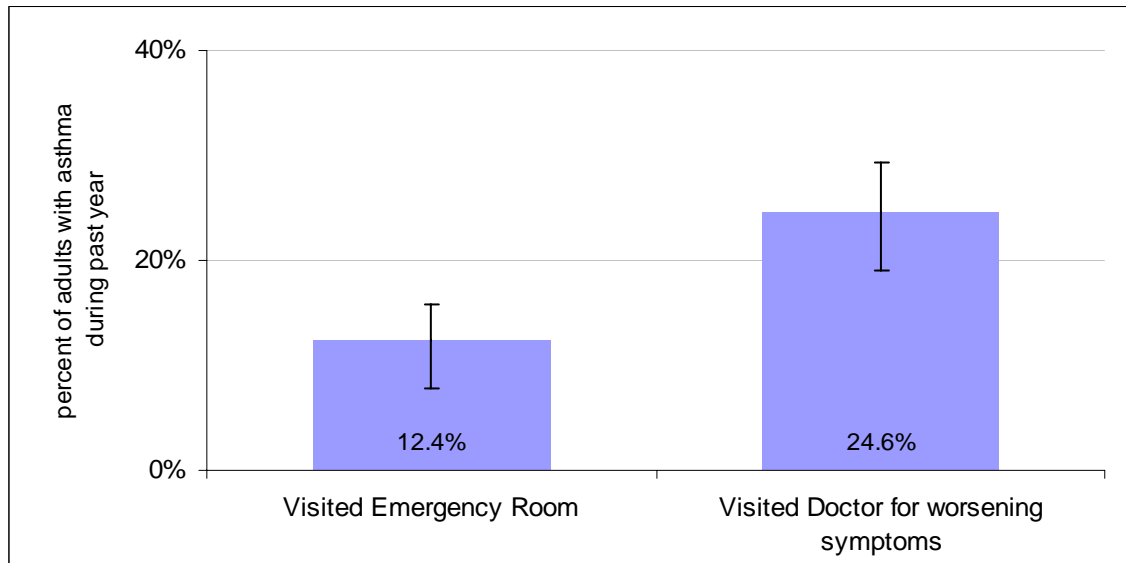
The dissemination and adoption of NAEPP clinical practice guidelines for asthma have likely improved clinical practices, and several studies have noted that preventive practices were related to decreased risk of hospitalization and emergency department visits.^{iv,v} This may explain some of the national decline in both mortality and hospitalization, through it remains unknown why the national pattern is not reflected in Washington State. Complicating interpretation, the threshold for hospital admissions for asthma may be increasing.^{vi} In this case, stable (rather than decreasing) hospitalization trends would suggest an increasing prevalence of asthma within the population, as seen in Washington (see Figure 23).

The total number of hospitalizations represents single visits by most people, but multiple visits by a smaller number of people. Hospitalization rates could be substantially reduced if better control of asthma was achieved among the subgroup of people who contribute multiple hospitalizations.

C. Urgent Medical Visits

About 25% of Washington adults with asthma reported that they had to visit a doctor for worsening symptoms during the past year, and 12% had visited an emergency department for acute care related to asthma (see Figure 3). This translates into 100,000 healthcare visits and 48,000 emergency department visits.

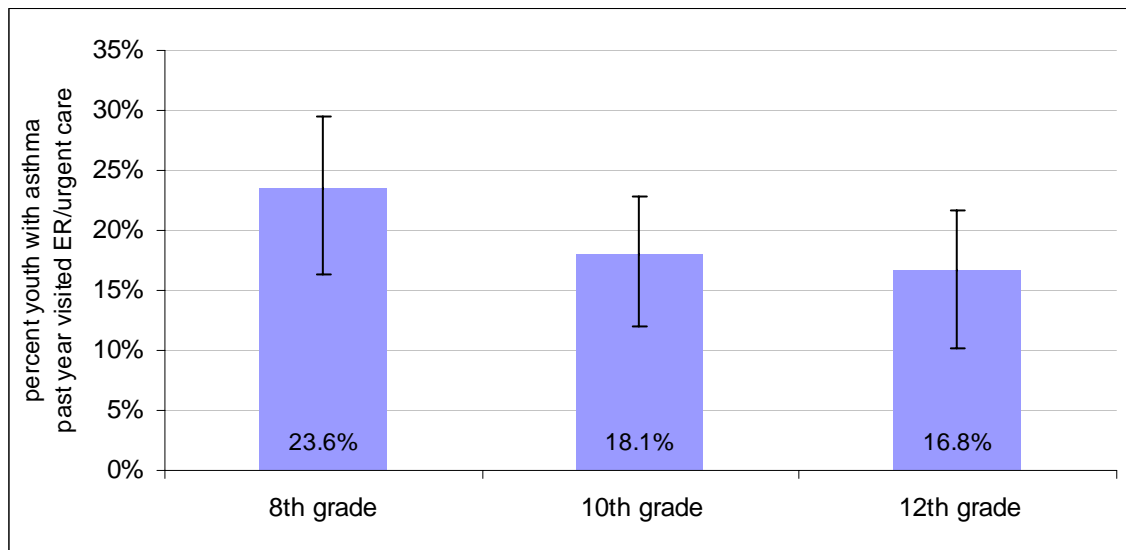
Figure 3: Prevalence of urgent medical visits for asthma during past year, among Washington adults with asthma



Source: 2001 Washington State Behavioral Risk Factor Surveillance System (BRFSS)

Young people appear more likely to visit emergency departments for asthma than older people; 8th graders were twice as likely as adults to report emergency room/urgent care visits for asthma during the past year. Nearly one in four eighth grade Washington youth with asthma reported visiting an emergency department or hospital for their asthma during the past year, with the percent of youth making ER visits decreasing with increasing grade (see Figure 4, $p=.06$).

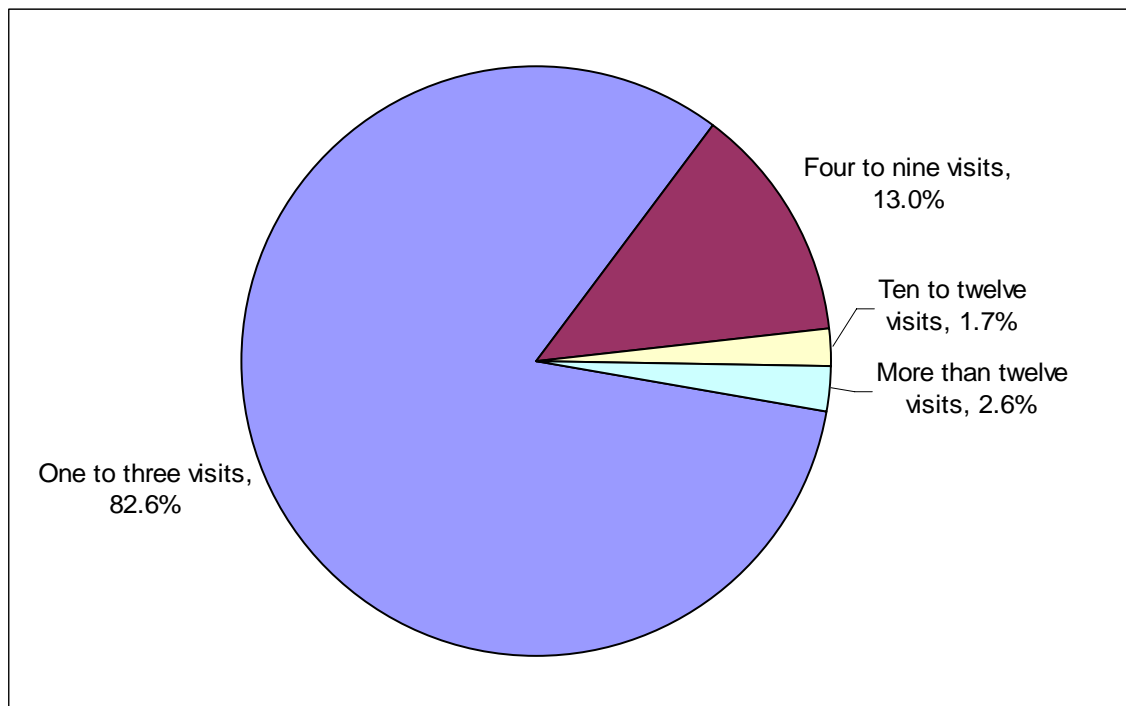
Figure 4: Prevalence of emergency room/urgent care visits during past year, among Washington youth with asthma



Source: 2004 Washington State Healthy Youth Survey (HYS).

Among youth who visited emergency departments during the past year, most (83%) did so only one time, but a small proportion (about 4%) visited emergency departments ten or more times (see Figure 5).

Figure 5: Distribution of emergency room/urgent care visits for asthma during past year, among Washington youth with asthma who visited ER/urgent care facilities



Source: 2004 Washington State Healthy Youth Survey (HYS). Combined 8-10-12th grade estimate

Urgent medical visits create a burden on already stressed medical systems. Healthcare providers must provide emergency care for people with asthma at the expense of attention to other patients. These visits also represent a burden for the individuals and their families or employers who must adjust for the unplanned time and expense of the visits.

D. Economic Costs

Considerable work has been done at the national level to estimate the economic burden of asthma on the healthcare system, and on society as a whole. Based on a review of multiple studies, national experts have concluded^{vii} that:

- Primary care for asthma is less expensive than hospital care
- Emergency treatment is more expensive than planned treatment
- Nurse-led treatment can be cost-effective
- Families can suffer from the financial burden of treating asthma.

Total Estimated Costs

Methods from previously published studies^{viii} were used to calculate national and Washington State medical expenditures in 2002 dollars (see Figure 6).

Direct expenditures as a result of asthma include hospital care, physician services, and prescription drugs. Each year, direct costs for asthma in Washington are about \$240

million. A large proportion of direct costs are represented by prescription drugs. Previous analyses^{ix} did not show the same majority of cost attributed to prescription drugs. Changing emphasis on the routine use of controller medications (per NAEPP recommendations) may be responsible for this increase in prescription drug use.

Indirect costs as a result of asthma include school days lost, loss of work, housekeeping,² and mortality. Annual indirect costs as a result of asthma are about \$166 million in Washington.

In total, each year, asthma costs Washington more than \$400 million. While this is only about one-quarter of the estimated annual \$1.5 billion cost of cigarette smoking in Washington,^x it is still a substantial cost that could potentially be reduced with effective disease management.

Figure 6: Estimated annual economic costs of asthma, Washington State and US

Annual Costs	US 2002	WA 2002
Direct Medical Expenditures		
Hospital care		
Hosp. Inpt. Care	\$2,592,000,000	\$68,000,000
ED care	\$725,700,000	\$19,000,000
Hosp outpt. Care	\$960,000,000	\$25,200,000
Physician services		
Physician inpatient care	\$125,900,000	\$3,300,000
Physician office visits	\$843,300,000	\$22,100,000
Prescriptions	\$3,901,900,000	\$102,300,000
All direct expenditures	\$9,148,800,000	\$239,900,000
Indirect costs		
School days lost	\$1,321,500,000	\$34,700,000
Loss of work/Outside Employment		
Men	\$495,300,000	\$13,000,000
Women	\$1,346,400,000	\$35,300,000
Housekeeping	\$1,004,500,000	\$26,300,000
Mortality	\$2,164,700,000	\$56,800,000
All indirect costs	\$6,332,300,000	\$166,100,000
Total Costs		
Direct and Indirect Costs	\$15,481,200,000	\$406,000,000

See technical notes for source of estimates. Estimates are synthetic based on published economic literature. Estimated rounded to nearest \$100,000.

Hospitalization Costs

Using Washington State hospitalization billing data (which includes information about direct charges for hospitalization), charges directly assigned to asthma hospitalizations were examined. In 2002 the more than 5,540 hospitalizations with a principal diagnosis of asthma accounted for a total of 16,796 hospital days.

² estimated as value of housekeeper wages among those who indicated they were responsible for caring for the home and family

Each 2002 Washington hospital stay lasted an average of 3 days and were charged an average of \$7,000. Better asthma control that reduced the number of hospitalizations could represent significant healthcare savings, in addition to the health benefits for individuals.

Hospitalizations are expensive, and more than half of the hospitalizations are paid for by publicly-funded medical programs. Twenty-one percent of Washington's 2002 asthma hospitalizations were paid for by Medicare, and 34% were paid by Medicaid/Healthy Options.

Workers' Compensation Costs

Costs associated with work-related asthma are documented as part of the Department of Labor and Industries' workers' compensation state fund.^{xi} From 1995 to 2002, there were 1,099 asthma-related claims paid by state fund dollars. The cost of these claims was \$12 million (an average of nearly \$11,000 each). Of this, about \$1.2 million (an average of \$150,000 per year) went to permanent partial disability payments for workers who developed permanent breathing problems. In addition, the fund reimbursed workers for a total of almost 79,000 lost workdays (an average of 10,000 per year). These measures of burden are potentially an underestimate, assuming that not all workers who miss time because of asthma (including asthma resulting from work-related exposure) would file claims for compensation.

E. Symptoms Interfering with Life

The classic symptom of aggravated asthma is an “asthma attack”. During an asthma attack, the insides of airways in the lungs become inflamed and swollen. Muscles around the airways tighten, and less air passes in and out of the lungs. Excess mucus forms in the airways, clogging them even more. The attack can include coughing, chest tightness, wheezing, and trouble breathing. ^{More than half (56%) of adults with asthma in Washington reported that they had an asthma attack during the previous year.}

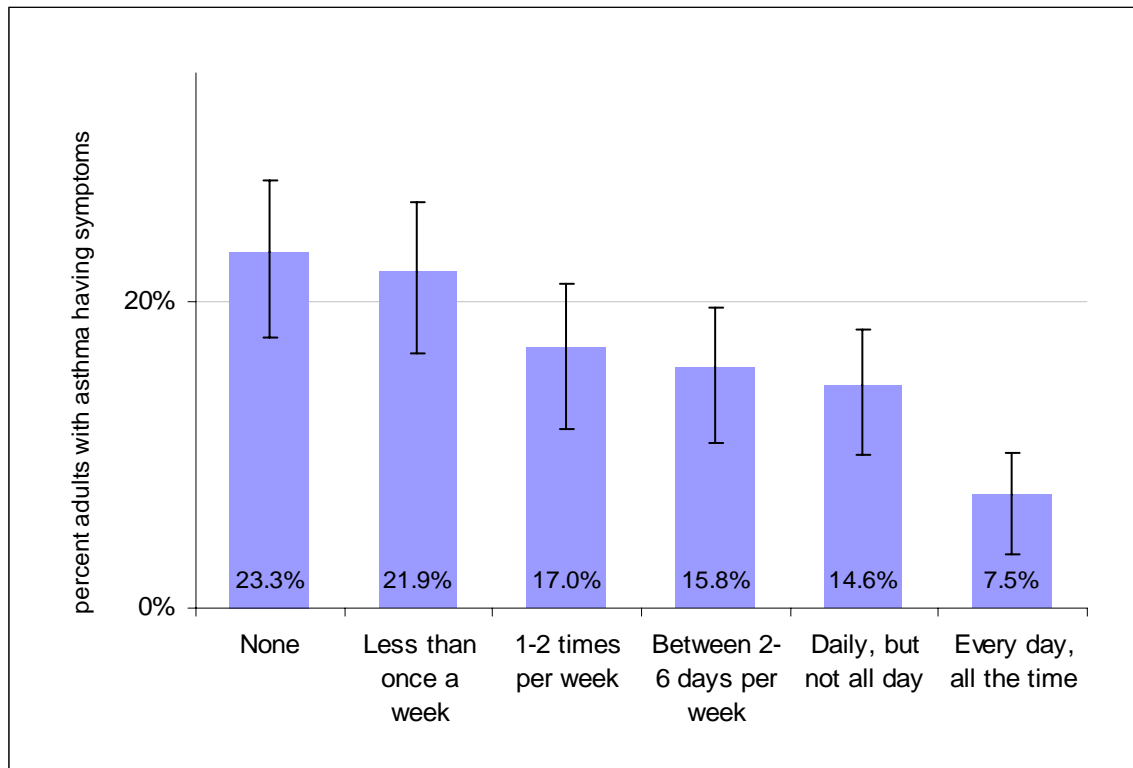
Asthma symptoms create an immediate stress or burden to the affected individual, and they also create a more indirect burden by interfering with normal activities.

Entire families are affected when a child has asthma. Parents must take time, including from work, to care for their children, provide oversight of medications, work to limit exposure to triggers in the home, and take them to medical visits. All of these activities can place considerable emotional and financial strain on the family.

Symptom frequency

Symptoms of asthma can be present without an asthma attack. Symptoms of asthma include cough, wheezing, shortness of breath, chest tightness and phlegm production when a person does not have a cold or respiratory infection. About 76% of adults with asthma reported having symptoms on one or more days during the past month; one in five reported having symptoms every day (see Figure 7).

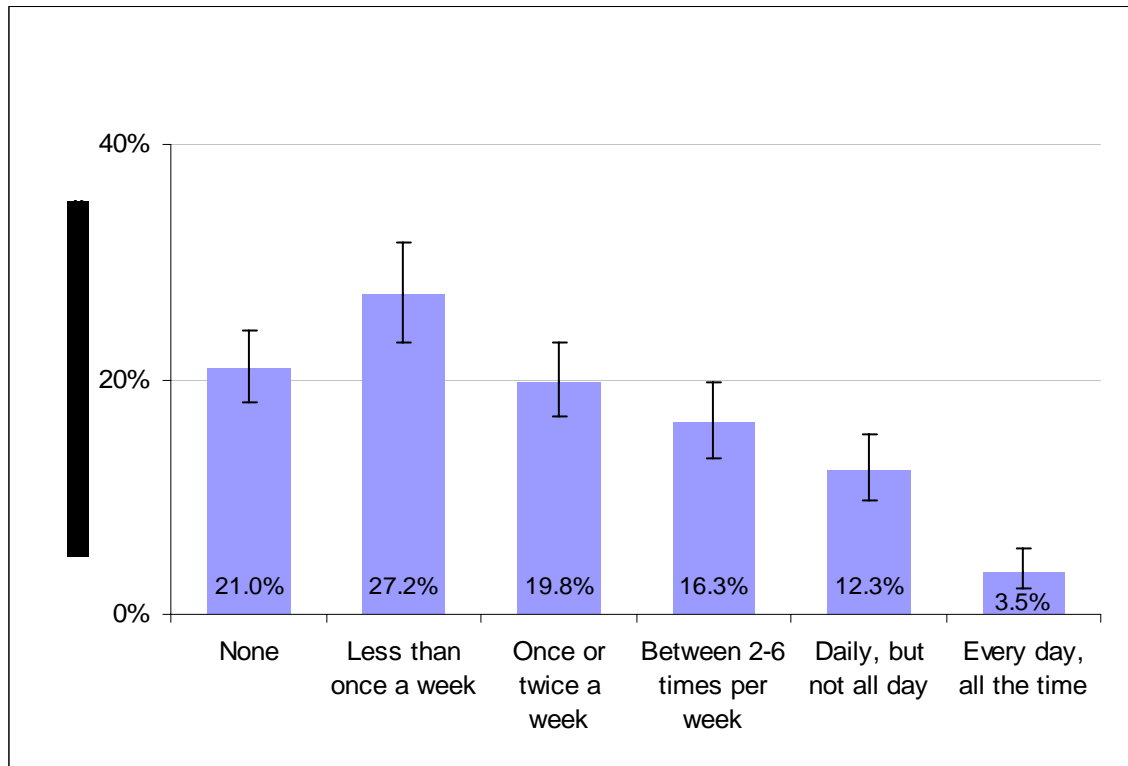
Figure 7: Distribution of asthma symptom frequency in past month, among Washington adults with asthma



Source: 2001 Washington State Behavioral Risk Factor Surveillance System (BRFSS)

One in seven youth with asthma experiences symptoms every day (see Figure 8). Fewer youth with asthma than adults with asthma report experiencing daily symptoms, although the difference is small.

Figure 8: Distribution of asthma symptom frequency in past month, among Washington youth with asthma



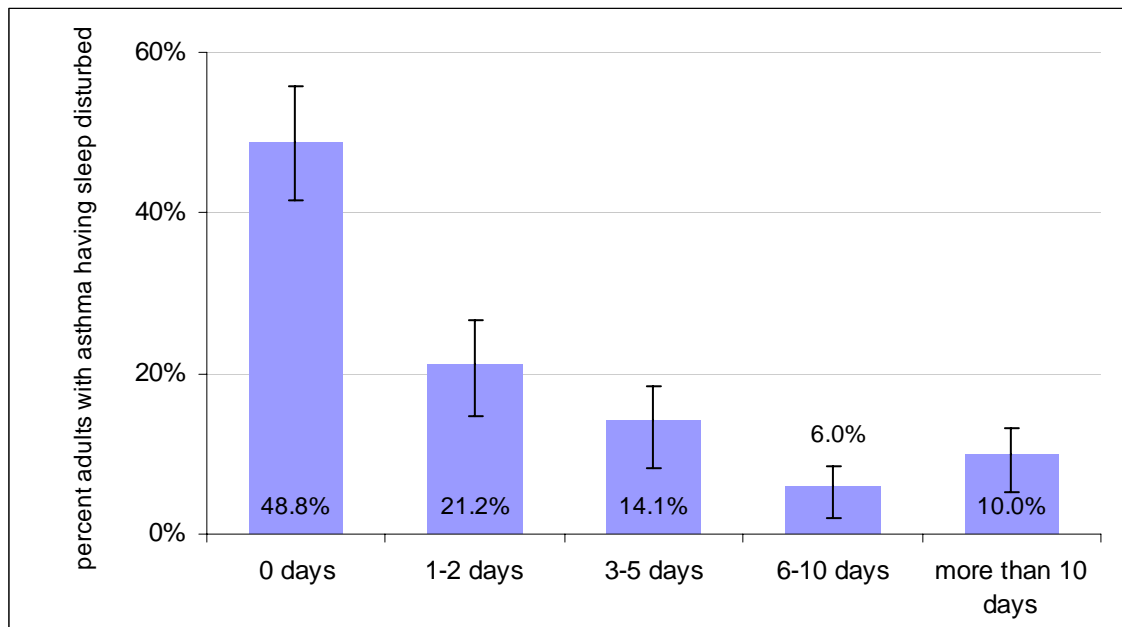
Source: 2004 Washington State Healthy Youth Survey (HYS), grades 8-10-12 combined

Sleep Disruption

People with asthma may have disturbed sleep due to their asthma symptoms. Loss of sleep can result in poor mental and physical functioning.

About half of Washington adults with asthma reported that they had lost sleep during the past month due to asthma symptoms (see Figure 9). One in ten had sleep disturbance more than ten days in the past month.

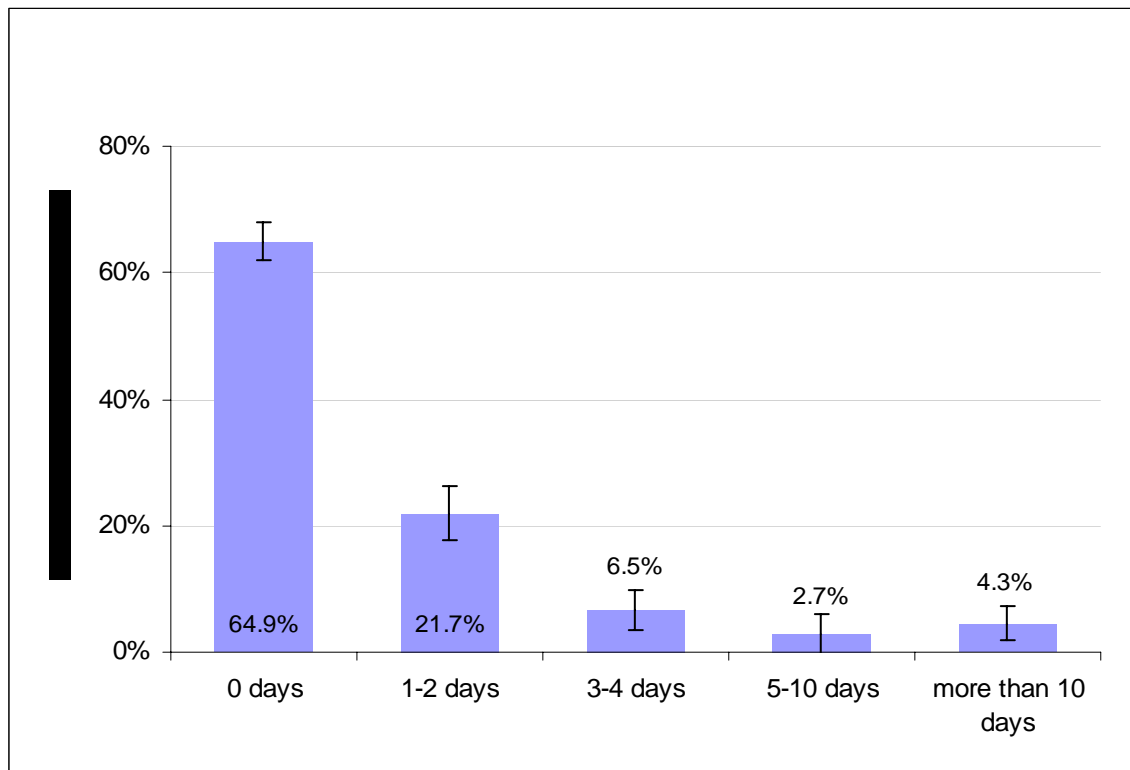
Figure 9: Distribution of asthma-related sleep disturbance frequency in past month, among Washington adults with asthma



Source: 2001 Washington State Behavioral Risk Factor Surveillance System (BRFSS)

In comparison to Washington adults, youth were less likely to report any sleep disturbance from asthma. About two-thirds of youth did not report sleep disturbance, but about ten percent had disturbance at least weekly (see figure 10).

Figure 10: Distribution of asthma-related sleep disturbance frequency in past month, among Washington youth with asthma

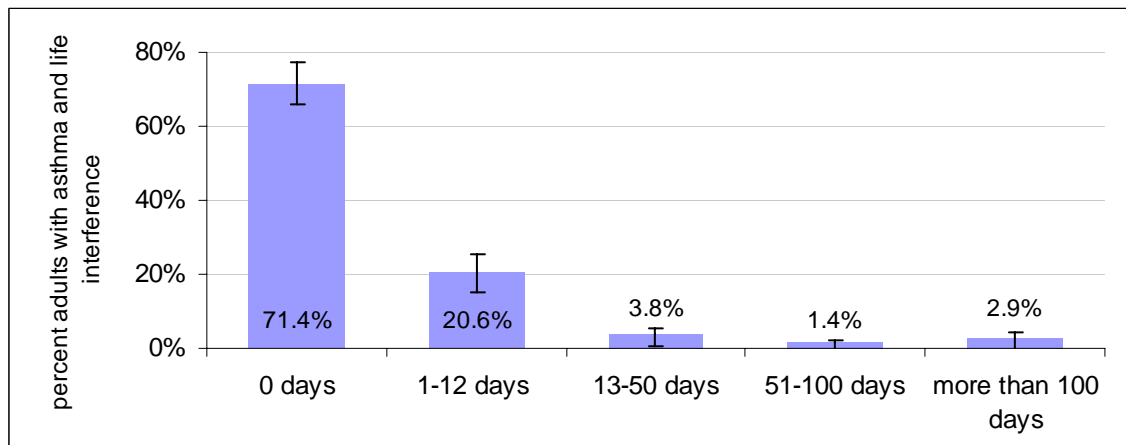


Source: 2004 Washington State Healthy Youth Survey (HYS), grades 8-10-12 combined

Interference with Usual Activities

As a result of serious asthma attacks, or due to other acute symptoms, people with asthma may sometimes not be able to do their usual activities. Just under one-third of Washington adults with asthma reported that they could not do their usual activities at least one day during the previous year because of their asthma. The majority of those with any days of limited activities were affected for twelve or fewer days (see Figure 11).

Figure 11: Distribution of days adults could not do usual activities because of asthma during previous year, among Washington adults with asthma



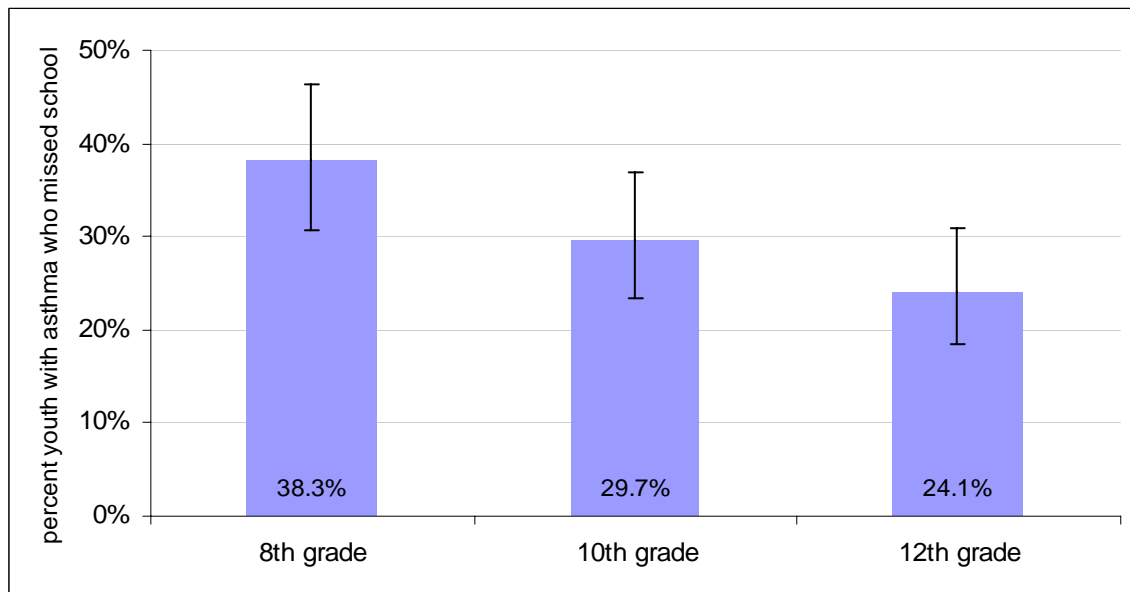
Source: 2001 Washington State Behavioral Risk Factor Surveillance System (BRFSS)

More than one-third of 8th graders with asthma reported missing at least one day of school in the previous year due to their asthma. Reported asthma-related absenteeism progressively decreased for high school students in comparison to 8th graders.³ Among 12th graders with asthma about one in four reported missing at least one day of school due to asthma during the previous year (see Figure 12). Youth with more severe asthma reported missing school more than youth with less severe asthma.⁴

³ Odds for any school absences vs. no absences by asthma status after adjusting for asthma symptom severity were 0.86. Reported asthma-related absenteeism progressively decreased with increasing grade ($p=.006$ for trend, see figure 50 for symptom severity distribution)

⁴ Odds for any school absences vs. no absences by asthma status after adjusting for grade were 2.3. Reported asthma-related absenteeism progressively increased with increasing asthma symptom severity ($p<.001$ for trend, see figure 50 for symptom severity distribution)

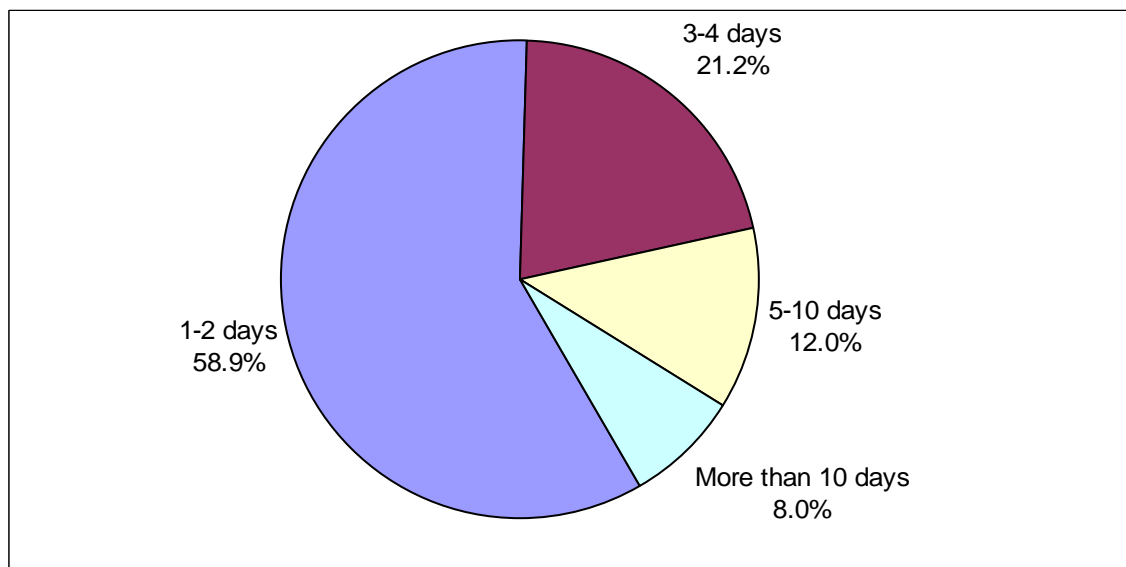
Figure 12: Percent of youth who missed school because of asthma during previous year, among Washington youth with asthma



Source: 2004 Washington State Healthy Youth Survey (HYS), among youth with current asthma.

Among youth who had missed any school during the previous year due to their asthma, most (59%) only missed one or two days, but 20% missed a week of school or more (see Figure 13). Loss of school time may contribute to poor academic performance and social development.

Figure 13: Distribution of days Washington youth missed school during the previous year because of asthma, among youth with asthma who missed any school days



Source: 2004 Washington State Healthy Youth Survey (HYS), grades 8-10-12 combined

National Objectives

Washington has not met Healthy People 2010 goals for reducing activity limitations among people with asthma to ten percent or less. In Washington, 29% of adults had one or more days of activity limitation during the previous year, and 24-38% of youth missed one or more days of school during the previous year. Healthy People 2010 objectives have not yet been established to specifically measure lost school or work days (see box).

Healthy People 2010 Objective 24-4

Reduce activity limitations among people with asthma.

Target:

- 10% or fewer people with asthma will experience activity limitations because of their asthma

* age-adjusted to year 2000 standard population

Healthy People 2010 Objective 24-5

Reduce the number of school or work days missed by people with asthma because of their asthma

(Targets not established)

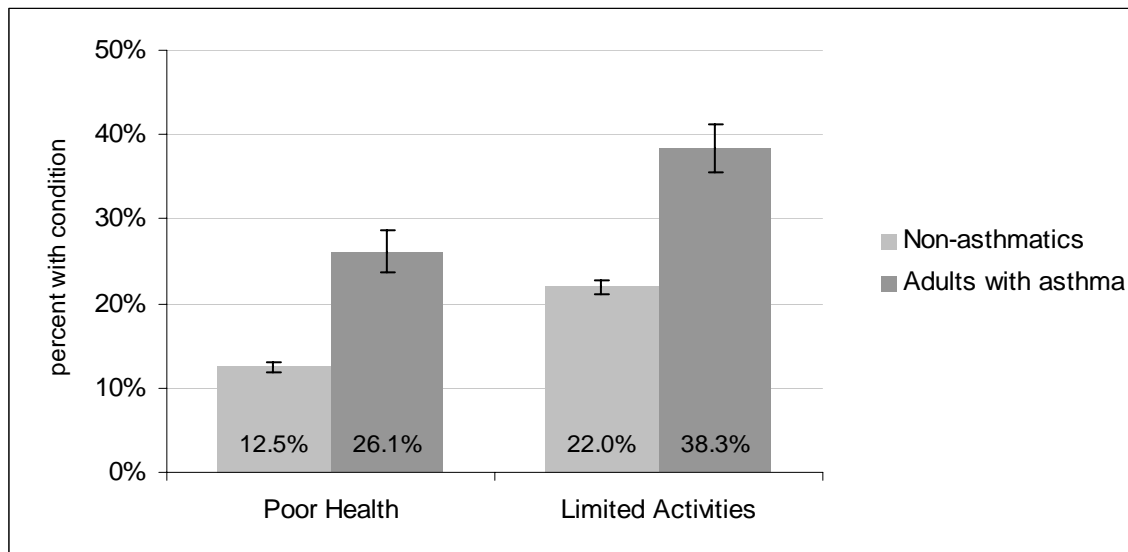
F. Quality of Life

Constant struggle with asthma symptoms and resultant disturbance of activities can contribute to decreases in overall quality of life.

General Health Status

In Washington, adults with asthma were twice as likely as adults without asthma to rate their health status as “fair” to “poor” (see Figure 14). Additionally, more than one-third of people with asthma, significantly more than people without asthma, reported that their activities were limited because of their health.

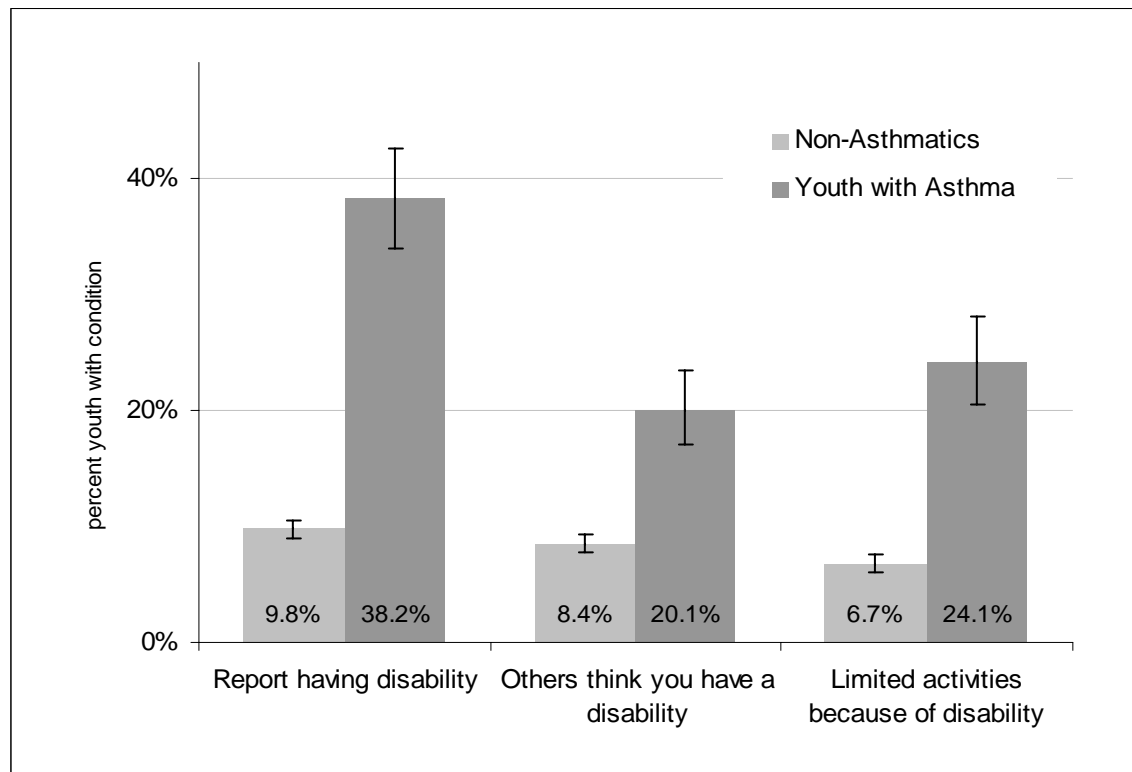
Figure 14: Prevalence of poor health/limited activities by asthma status, among Washington adults



Source: 2003 Washington State Behavioral Risk Factor Surveillance System (BRFSS).

Similar to adults, youth with asthma were more likely to report poor health than youth without asthma. For example, 10th grade youth with asthma were four times as likely as youth without asthma to report having a long-term disability or long-term health problem. One in five youth with asthma reported that they believe other people would consider them to have a disability, and one in four (four times as many as youth without asthma) said that they had to limit their activities because of a disability or long-term health condition (see Figure 15).

Figure 15: Prevalence of disability and limited activities by asthma status, among Washington youth (10th grade)



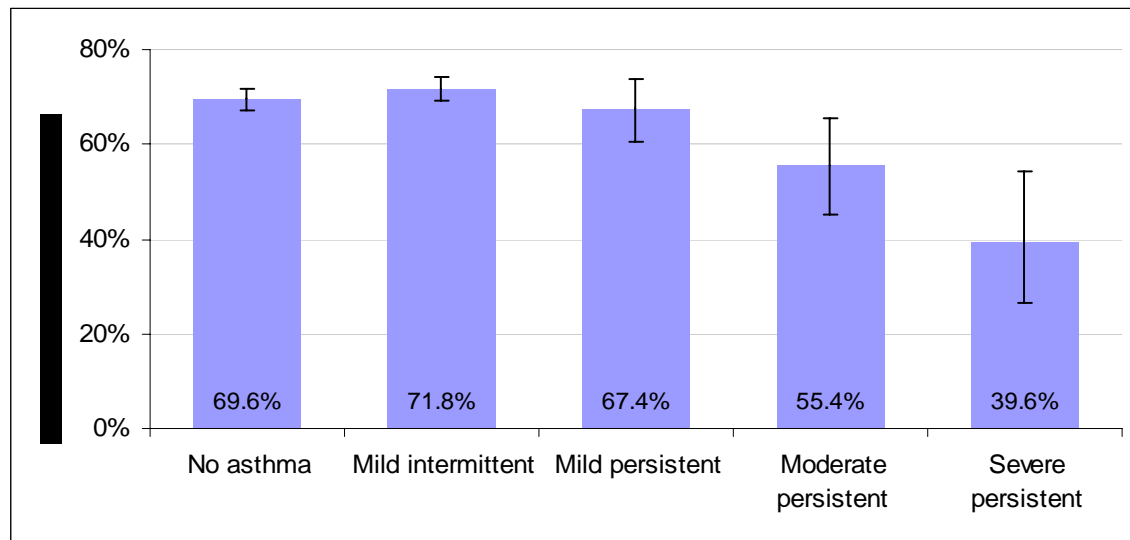
Source: 2002 and 2004 combined Washington State Healthy Youth Survey (HYS).

Academic Achievement

Loss of school days due to asthma symptoms may result in decreased academic performance. Examination of differences in academic achievement for youth with and without asthma did not reveal any differences; however, differences were observed after stratifying by asthma severity (see discussion in Chapter VI for description of asthma symptom severity). Young people with mild intermittent or mild persistent asthma were as likely as youth without asthma to report high academic performance (getting mostly “As” and “Bs” in school); however, youth with moderate persistent and severe persistent asthma had decreased academic performance (see Figure 16). The odds for high academic performance among youth with severe persistent asthma were only 60% in comparison to youth with no asthma or mild asthma. The odds for high academic achievement among youth with moderate persistent asthma were 80% in comparison to youth with no asthma or mild asthma.⁵

⁵ The odds for high academic achievement (mostly As and Bs) vs. other grades (mostly Cs, Ds, Fs) by asthma status after adjustment for grade and gender were 0.65 (95% CI: 0.60-0.71). The proportion of youth with high academic achievement decreases with increasing asthma severity ($p < .001$ for trend). Only 10th grade shown in Figure 15.

Figure 16: Prevalence of high academic performance by asthma status and symptom severity, among Washington youth (10th grade)

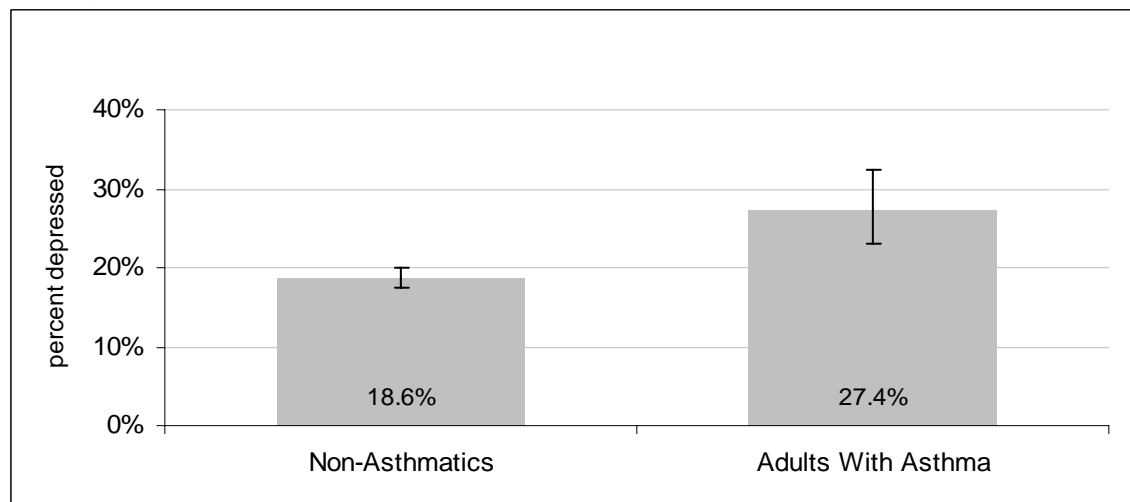


Source: 2002 and 2004 combined Washington State Healthy Youth Survey (HYS).

Mental Health

The effect of asthma on quality of life is not just limited to physical health and activity levels, it can also include mental health. Among adults, about one in four people with asthma reported depression – significantly more than adults without asthma (see Figure 17).

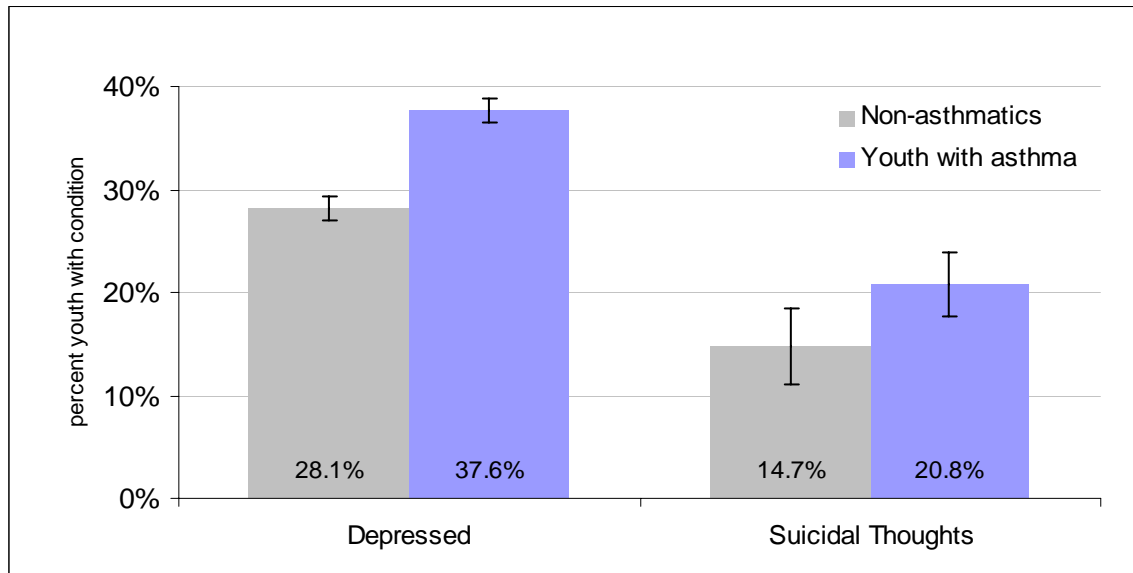
Figure 17: Prevalence of depression by asthma status, among Washington adults



Source: 2003 Washington State Behavioral Risk Factor Surveillance System (BRFSS).

Even more disturbing, youth with asthma were significantly more likely than youth without asthma to report depression and suicide ideation.⁶ Among youth with asthma, 38% reported being depressed and 21% reported “seriously thinking” about suicide during the previous year (see Figure 18).

Figure 18: Prevalence of depression and suicidal thoughts by asthma status, among Washington youth



Source: 2002 and 2004 HYS combined, grade standardized for equal distributions of 8th-10th-12th respondents.

⁶ Odds for depression 1.5 ($p < .001$) associated with having current asthma in comparison to not having asthma, after adjustment for grade and gender; Odds for “seriously thinking” about suicide 1.5 ($p < .001$) associated with having current asthma in comparison to not having asthma, after adjustment for grade and gender

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